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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,299	05/17/2005	Bruno Johan Georges Putzeys	BE 020038	5804

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PHILIPS INTELLECTUAL PROPERTY & STANDARDS
P.O. BOX 3001
BRIARCLIFF MANOR, NY 10510

EXAMINER

PEREZ, JAMES M

ART UNIT	PAPER NUMBER
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2611

MAIL DATE	DELIVERY MODE
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02/20/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/535,299

Applicant(s)PUTZEYS, BRUNO JOHAN
GEORGES**Examiner**

James M. Perez

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8 and 9 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 May 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 5/17/2005.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

Detailed Action

Drawings

1. Figures 1A through 1C should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-2, and 8-9 rejected under 35 U.S.C. 103(a) as being unpatentable over Melanson (USPN 6,414,614) in view of Kang (USPN 7,142,819).

With regards to claim 1, Melanson teaches a pulse width-modulated noise shaper (210; 410), comprising:

an input adder (11) having a first input for receiving an input signal (S_{in}), and a second input (fig. 6: element 38);

an output terminal (figs. 6 and 10: output of element 144);

a main filter (130) having an input coupled to receive an output signal from said input adder (11) (figs. 6 and 10: elements 104a, 104b, 40, 56, and 44);

a pulse width modulation circuit (220) having an input coupled to receive a signal derived from an output of said main filter (130) (figs. 6 and 10: element 108), an output coupled to an output terminal of the pulse width-modulated noise shaper (figs. 6 and 10: output of element 144);

a feedback path (216; 266) coupled between the output terminal and the second input for generating a feedback signal (SFB) and for feeding this feedback signal (SFB) back to the second input (figs. 6 and 10: elements 38, 104a, 104b, 40, 56, 242, 244, 504a, and 504b, and 44).

Melanson does not explicitly teach pulse width-modulated noise shaper circuit operable at a clock frequency, and the main filter (130) being operable at a clock frequency of at least the clock frequency (f_{ck}) of the pulse width modulation circuit (220).

Kang teaches the pulse width-modulated noise shaper circuit operable at a clock frequency (fig. 2b: MCLK); and

the main filter (130) being operable at a clock frequency of at least the clock frequency (f_{ck}) of the pulse width modulation circuit (220) (fig. 2b: elements MCLK, 202, 203, and 220).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the pulse width-modulated noise shaper circuit of Melanson with the clocked pulse width-modulated noise shaper circuit of Kang in order to create an improved device compensate for distortion introduced to the output signal in real time, thus allowing the circuit to have lower bit errors (Kang: col. 3, lines 5-15).

With regards to claim 2, Melanson in view of Kang teaches the limitations of claim 1.

Melanson further teaches a power stage (260), coupled between the output of the pulse width modulation circuit (220) and the output terminal ((figs. 6, 8, and 10: element 114, 114a-d));

the feedback path (266) comprising means for analog-to-digital conversion (figs. 6, 8, and 10: element 802).

With regards to claims 8-9, Melanson teaches digital-to-analog converter (abstract) comprising a pulse width-modulated noise shaper comprising:

an input adder (11) having a first input for receiving an digital input signal (wherein the input signal inherently has signal processing circuitry for providing the input signal in digital format), and a second input (fig. 6: element 38);

an output terminal (figs. 6 and 10: output of element 144);

a main filter (130) having an input coupled to receive an output signal from said input adder (11) (figs. 6 and 10: elements 104a, 104b, 40, 56, and 44);

a pulse width modulation circuit (220) having an input coupled to receive a signal

derived from an output of said main filter (130) (figs. 6 and 10: element 108), an output coupled to an output terminal of the pulse width-modulated noise shaper (figs. 6 and 10: output of element 144);

a feedback path (216; 266) coupled between the output terminal and the second input for generating a feedback signal (SFB) and for feeding this feedback signal (SFB) back to the second input (figs. 6 and 10: elements 38, 104a, 104b, 40, 56, 242, 244, 504a, and 504b, and 44).

Melanson does not explicitly teach pulse width-modulated noise shaper circuit operable at a clock frequency, and the main filter (130) being operable at a clock frequency of at least the clock frequency (fck) of the pulse width modulation circuit (220).

Kang teaches the pulse width-modulated noise shaper circuit operable at a clock frequency (fig. 2b: MCLK); and

the main filter (130) being operable at a clock frequency of at least the clock frequency (fck) of the pulse width modulation circuit (220) (fig. 2b: elements MCLK, 202, 203, and 220).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the pulse width-modulated noise shaper circuit of Melanson with the clocked pulse width-modulated noise shaper circuit of Kang in order to create an improved device compensate for distortion introduced to the output signal in real time, thus allowing the circuit to have lower bit errors (Kang: col. 3, lines 5-15).

4. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Melanson (USPN 6,414,614) in view of Kang (USPN 7,142,819), and further in view of Risbo (USPN 6,518,838).

With regards to claim 3, Melanson in view of Kang teaches the limitations of claim 2.

Melanson does not explicitly teach a second adder (240) having a first input (241) coupled to the output terminal; a loop filter (244) having an input coupled to receive an output signal from said second adder (240); an analog-to-digital converter (245) having an input coupled to receive an output signal from said loop filter (244), and an output coupled to the second input of the input adder (11); and a digital-to-analog converter (246) having an input coupled to receive an output signal from the analog-to-digital converter (245), and an output coupled to a second input (242) of the second adder (240).

Risbo teaches a second adder (240) having a first input (241) coupled to the output terminal (fig. 3: element 8 and element 3 are electrically coupled);

a loop filter (244) having an input coupled to receive an output signal from said second adder (240) (fig. 3: element 4);

an analog-to-digital converter (245) having an input coupled to receive an output signal from said loop filter (244) (fig. 3: elements 4-5), and an output coupled to the second input of the input adder (11) (fig. 3: elements 2, 5, and 3); and

a digital-to-analog converter (246) having an input coupled to receive an output signal from the analog-to-digital converter (245) (fig. 3: elements 5 and 2), and an

output coupled to a second input (242) of the second adder (240) (fig. 3: elements 2 and 3).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the pulse width-modulated noise shaper circuit of Melanson with the pulse modulation circuit of Risbo in order to create an improved apparatus with reduced power supply requirements and reduced errors at the output of the power stage (Risbo: col. 4, lines 55-62).

With regards to claim 4, Melanson in view of Kang in further view of Risbo teaches the limitations of claim 3.

Melanson does not explicitly teach said analog-to-digital converter (245) has a resolution of less than 5 bits.

Risbo teaches said analog-to-digital converter (245) has a resolution of less than 5 bits (fig. 3: output of element 5: 2 bits).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the pulse width-modulated noise shaper circuit of Melanson with the pulse modulation circuit of Risbo in order to create an improved apparatus with reduced power supply requirements and reduced errors at the output of the power stage (Risbo: col. 4, lines 55-62).

5. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Melanson (USPN 6,414,614) in view of Kang (USPN 7,142,819), and further in view of Grosso (USPN 4,473,009) with Kutukut (USPN 6,150,795).

With regards to claim 5, Melanson in view of Kang teaches the limitations of claim 2.

Melanson teaches said power is a class-D power stage (figs. 8 and 10: element 114a-114d).

Melanson does not explicitly teach two Limitations: Limitation 1) said pulse width modulation circuit (220) and said power stage (260) comprise: a first branch comprising a first driver, and a first power stage (350) having an input coupled to receive an output signal from said first driver), said first driver having a first input (311) coupled to receive the signal derived from the output signal of said main filter (130), and said pulse width modulation circuit (220) further comprising a reference signal generator (380) having an output coupled to a second input (312) of said first driver; and Limitation 2) said first driver being driven by comparator unit.

Limitation 1)

Grosso teaches a first branch comprising a first power stage (figs. 10-11: element 101: driver) having a first input (311) coupled to receive the signal derived from the output signal of said main filter (figs. 10 and 11: elements 1 and 101-102), and said pulse width modulation circuit (220) further comprising a reference signal generator (380) having an output coupled to a second input (312) of said first driver (figs. 10-11: Vref).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the pulse width-modulated noise shaper circuit of Melanson with the pulse width-modulation circuit of Grosso in order to create an improved pulse width modulation circuit which provides accurate pulse timing with increased resistance to noise (Grosso: col. 1, line 55 through col. 2, line 17).

Limitation 2)

Kutkut teaches said push-pull drivers have comparators at the driver input (fig. 19: elements 156, 168, 172 and 173).

One of ordinary skill in the art would clearly recognize that the use of a comparator to drive the push-pull driver circuit would increase the circuits tolerance to noise in the input signal. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have the comparator circuit of Kutkut drive the driver circuit of Grosso in order to smooth out the input signal and increase the pulse width modulation circuit's tolerance to noise in the input signal.

With regards to claim 6, Melanson in view of Kang in further view of Grosso with Kutkut teaches the limitations of claim 5.

Melanson teaches that the power stage is a class-D power stage (figs. 8 and 10: element 114a-114d).

Melanson does not explicitly teach two Limitations: Limitation 1) a second branch comprising a second driver (320), and said second driver (320) having a first input (321) coupled to receive a signal which is inverted with respect to the signal derived from the

output signal of said main filter (130), and said reference signal generator (380) having an output coupled to a second input (322) of said second driver (320); and Limitation 2) said second driver being driven by comparator unit.

Limitation 1)

Grosso teaches a second branch comprising a second driver (figs. 10-11: elements 101-102), and said second driver (320) having a first input (321) coupled to receive a signal which is inverted with respect to the signal derived from the output signal of said main filter (figs. 10-11: elements inverters and 102), and said reference signal generator (380) having an output coupled to a second input of said second driver (figs. 10-11: elements Vref and 102);

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the pulse width-modulated noise shaper circuit of Melanson with the pulse width-modulation circuit of Grosso in order to create an improved pulse width modulation circuit which provides accurate pulse timing with increased resistance to noise (Grosso: col. 1, line 55 through col. 2, line 17).

Limitation 2)

Kutkut teaches said push-pull drivers have comparators at the driver input (fig. 19: elements 156, 168, 172 and 173).

One of ordinary skill in the art would clearly recognize that the use of a comparator to drive the push-pull driver circuit would increase the circuit's tolerance to noise in the input signal. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have the comparator circuit of Kutkut drive the

driver circuit of Grosso in order to smooth out the input signal and increase the pulse width modulation circuit's tolerance to noise in the input signal.

Allowable Subject Matter

6. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Perez whose telephone number is 571-270-3231. The examiner can normally be reached on Monday through Friday: 9am to 5pm EST.

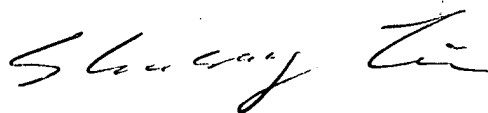
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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JP
2/19/2008



SHUWANG LIU
SUPERVISORY PATENT EXAMINER